Section 7.0, Mitigation Plan, discusses functional value replacement through restoration of degraded wetlands.

7.0 MITIGATION PLAN

The following discussion summarizes the mitigation elements of the recommended plan and how the plan was developed.

7.1 Mitigation of Wetland Impacts

A Memorandum of Agreement between the USACOE and the EPA outlines the federal policy on wetland mitigation and establishes a preference for the avoidance and minimization of wetland impacts over compensatory mitigation. However, despite this preference on the part of regulators, residual wetland impacts from economic development (i.e., where avoidance is not "practicable") are inevitable. In such cases, compensatory mitigation in the form of wetland creation, restoration, or enhancement will be used to offset the impacts of wetland loss on aquatic ecosystems, wildlife populations, and related social, economic, and aesthetic interests. The mitigation Memorandum of Agreement provides guidance on what constitutes appropriate compensation on the bases of wetland functions and values. The Memorandum of Agreement specifies that wetland mitigation should "strive to achieve a goal of no overall net loss of wetland values and functions". Moreover, the Memorandum of Agreement specifically requires that the assessment of what constitutes appropriate mitigation of wetland impacts should be based "solely on the values and functions of the aquatic resources impacted". In principle, therefore, compensation requirements under the federal program demand a comparison between the wetland functions and values expected from the mitigation project and those lost with the destruction of the original wetland.

The compensatory mitigation proposed for this project consists of the restoration or enhancement of degraded wetlands within the region and creation of littoral zones adjacent to the quarry lakes. The compensation ratio for such projects needs to be adjusted to account for the preexisting values and functions. Otherwise compensation projects would be "credited" for providing wetland values and functions that would have existed in their absence.

Another factor in determination of compensation ratios is the degree of risk and uncertainty in the mitigation projects to achieve anticipated wetland values and functions. The key to incorporating issues of risk into the determination of compensation ratios is estimating the magnitude of the risk of failure. In an attempt to manage ecological risks and maintain the long term value of the wetland compensation sites, a panel of professional biologist was asked to reach consensus as to the expected functional index values for the restored and created wetlands. The expected functional index (FI) values for the 20 covertypes found within the study area, as

presented in Table 7.1-1 represents a hypothetical best case for restoration of these cover types.

The framework presented here for assessing wetland compensation is based on preventing loss in the present value of the expected future stream of wetland functions and values available from the original and the compensatory wetland.

Using the expected FI values presented in table 7.1-1, an analysis of potential compensation sites can be undertaken. The following areas within the lakebelt study area were evaluated on this basis.

Table 7.1-1 Expected FI Values by Cover Type

Cover Type	Expected FI
Prairie	0.98
Prairie with Melaleuca (10-50%)	0.98
Prairie with Melaleuca (50-75%)	0.98
Dense Melaleuca	0.98
Dense Melaleuca Saplings	0.98
Tree Islands	1.00
Willow Heads	1.00
Pond Apple	1.00
Disturbed (Forested and Open)	0.98
Disturbed Prairie	0.98
Disturbed Prairie with Melaleuca (10-50%)	0.98
Disturbed Prairie with Melaleuca (50-75%)	0.98
Canals	0.37
Lakes (open water)	0.21
Littoral Zone	0.85
Lake Perimeter	0.98
Other Water	0.26
Agriculture	0.17
FPL Transmission Corridors	0.67
Developed	0.06

The cover types within the western half of the Pennsuco wetlands are shown in figure 12, along with their associated acreage, existing FI values, and resulting HU's. Table 7.1-2 presents the expected HU changes due to restoration of this area.

The cover types within the eastern half of the Pennsuco wetlands are shown in figure 13, along with their associated acreage, existing FI values, and resulting HU's. Table 7.1-3 presents the expected HU changes due to restoration of this area.

The complete restoration, i.e., all targeted cover types in the Pennsuco wetlands achieving their expected FI values, would result in an approximate 1,808.41 habitat unit increase in the functions and values of this area. This restoration feature represents approximately 23.4% of the functions of the wetlands impacted by the recommended plan and are mitigated through restoration/enhancement of degraded wetlands within the study area.

A well-conceived and constructed littoral zone would reduce mining impacts even further by increasing the functions and values of the lakes with their associated littoral zones.

Table 7.1-2 Western Pennsuco Wetland Restoration Values

COVER TYPE	FI	ACRES	HU'S	EXPECTED FI	HU'S	DELTA
Agriculture	0.17	-	-	0.17	-	-
Dense Melaleuca	0.42	689.83	289.73	0.98	676.03	386.30
Dense Melaleuca Saplings	0.44	84.71	37.27	0.98	83.02	45.74
Developed Lands	0.06	69.21	4.15	0.06	4.15	-
Disturbed (Forested & Open)	0.50	68.47	34.24	0.98	67.10	32.87
Disturbed Prairie	0.69	-	-	0.98	-	-
Disturbed Prairie w/ Melaleuca (10-50%)	0.67	-	-	0.98	-	-
Disturbed Prairie w/ Melaleuca (50-75%)	0.62	-	-	0.98	-	-
FPL Transmission Corridors	0.64	-	-	0.67	-	-
Lake Perimeter	0.04	-	-	0.98	-	-
Other Water	0.31	2.06	0.63	0.26	0.54	(0.09)
Prairie	0.98	2,718.37	2,664.00	0.98	2,664.00	-
Prairie w/ Melaleuca (10-50%)	0.90	1,374.41	1,236.97	0.98	1,346.92	109.95
Prairie w/ Melaleuca (50-75%)	0.72	1,162.87	837.27	0.98	1,139.61	302.35
Tree Islands	0.91	22.24	20.24	1.00	22.24	2.00
Willow Heads	0.95	22.90	21.76	1.00	22.90	1.15
Pond Apple	0.92	-	-	1.00	-	-
SUBTOTAL		**6,215.07**	**5,146.25**		**6,026.52**	**880.27**
Canals	0.37	28.54	10.56	0.37	10.56	-
Lakes (Open Water)	0.21	4.76	1.00	0.21	1.00	-
Littoral Zone	0.59	-	-	0.85	-	-
SUBTOTAL		**33.30**	**11.56**		11.56	-
TOTAL		**6,248.37**	**5,157.81**		**6,038.07**	**880.27**

Table 7.1-3 Eastern Pennsuco Wetland Restoration Values

COVER TYPE	FI	ACRES	HU'S	ENHANCEMENT FI	HU'S	DELTA
Agriculture	0.17	-	-	0.98	-	-
Dense Melaleuca	0.42	1,089.97	457.79	0.98	1,068.17	610.38
Dense Melaleuca Saplings	0.44	16.56	7.29	0.98	16.23	8.94
Developed Lands	0.06	19.79	1.19	0.06	1.19	-
Disturbed (Forested & Open)	0.50	43.89	21.95	0.98	43.01	21.07
Disturbed Prairie	0.69	-	-	0.98	-	-
Disturbed Prairie w/ Melaleuca (10-50%)	0.67	-	-	0.98	-	-
Disturbed Prairie w/ Melaleuca (50-75%)	0.62	-	-	0.98	-	-
FPL Transmission Corridors	0.64	-	-	0.67	-	-
Lake Perimeter	0.04	-	-	0.98	-	-
Other Water	0.31	3.38	1.05	0.26	0.88	(0.17)
Prairie	0.98	3,144.40	3,081.51	0.98	3,081.51	-
Prairie w/ Melaleuca (10-50%)	0.90	525.58	473.02	0.98	515.07	42.05
Prairie w/ Melaleuca (50-75%)	0.72	927.98	668.15	0.98	909.42	241.27
Tree Islands	0.91	38.37	34.92	1.00	38.37	3.45
Willow Heads	0.95	2.88	2.74	1.00	2.88	0.14
Pond Apple	0.92	-	-	0.98	-	-
SUBTOTAL		**5,812.80**	**4,749.59**		**5,676.73**	**927.14**
Canals	0.37	62.64	23.18	0.37	23.18	-
Lakes (Open Water)	0.21	-	-	0.21	-	-
Littoral Zone	0.59	-	-	0.85	-	-
SUBTOTAL		**62.64**	**23.18**		23.18	-
Not Available for Mitigation		1,065.41				
TOTAL		**6,940.85**	**4,772.76**		**5,699.91**	**927.14**

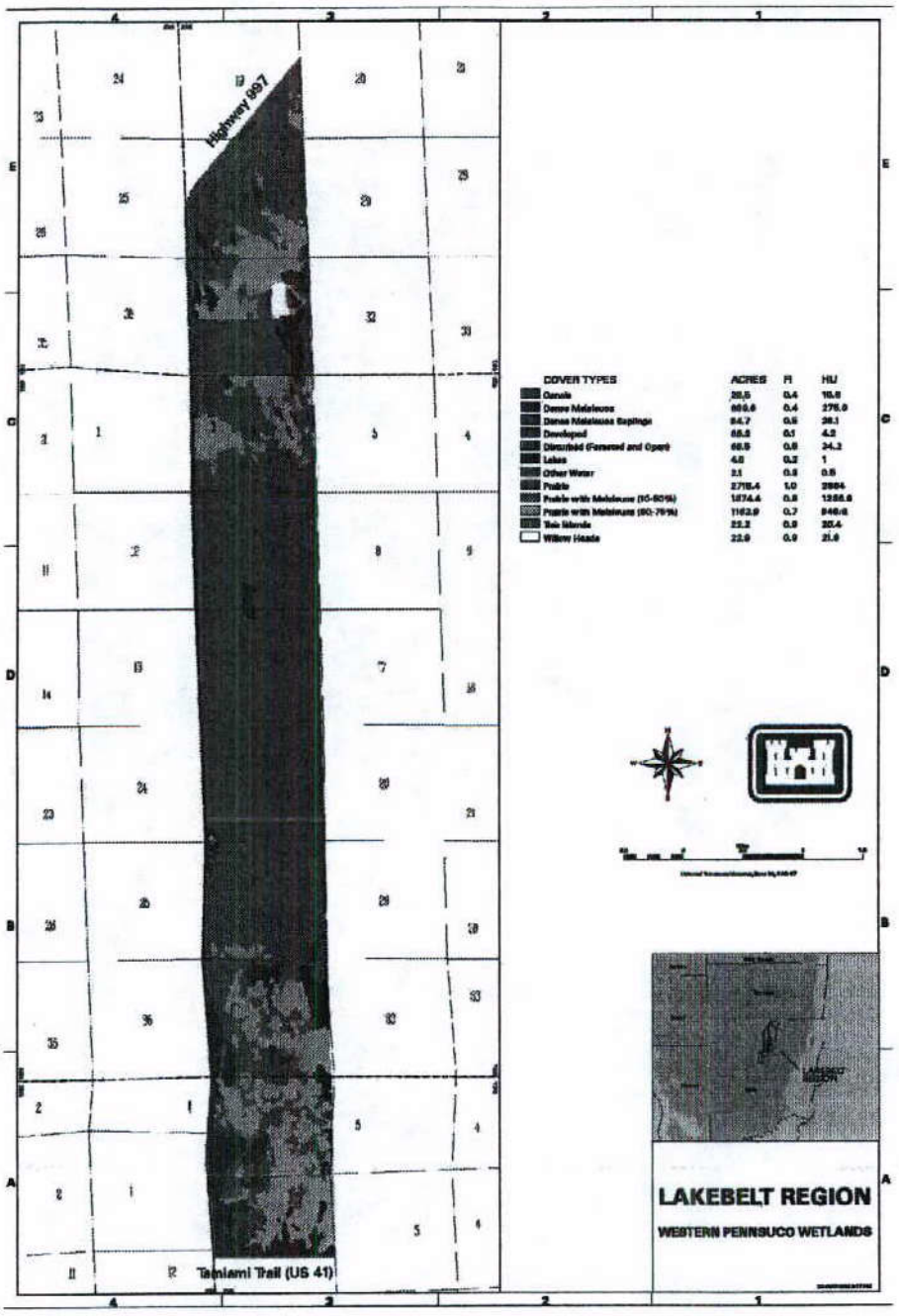

Figure 12 Western Pennsuco Wetlands Map

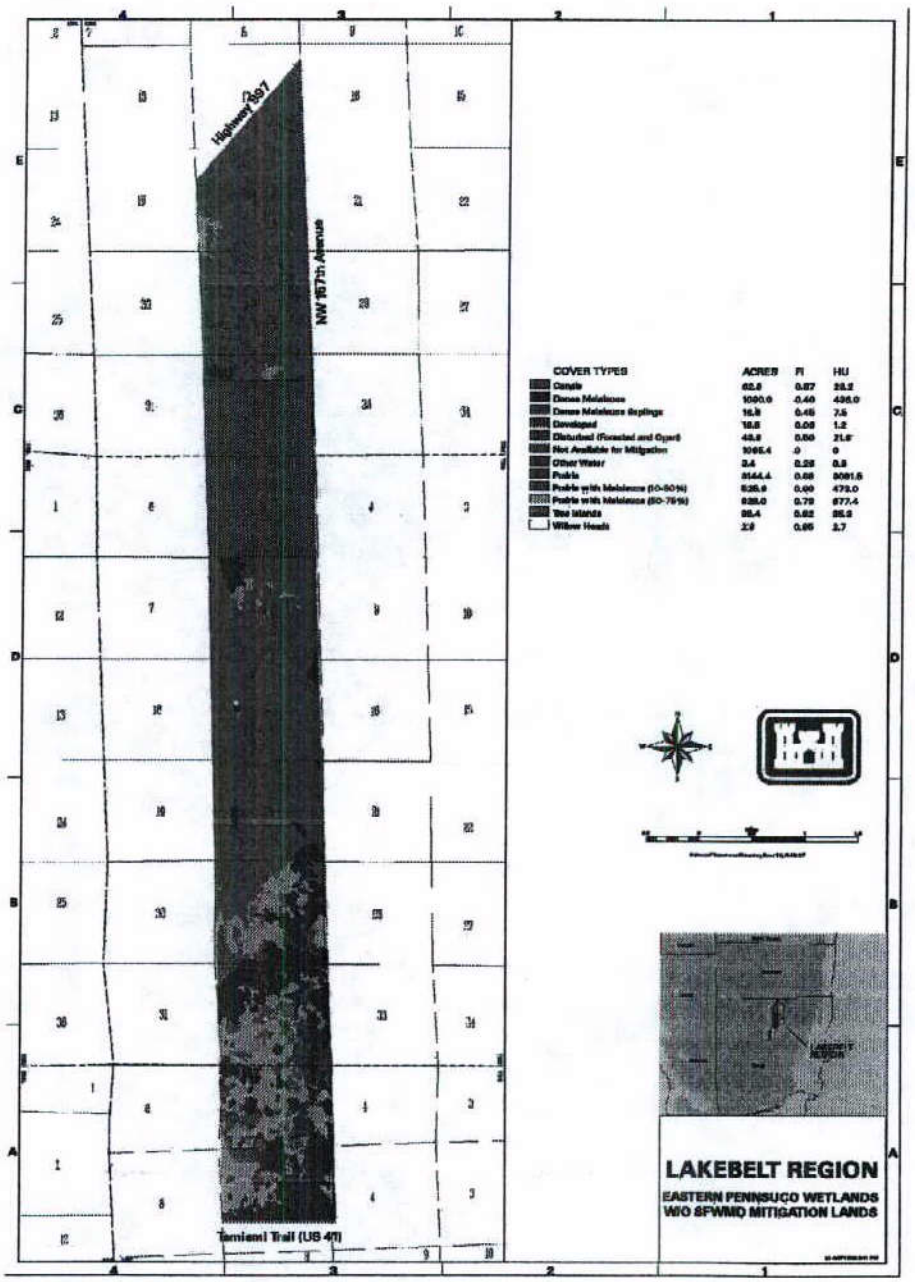

Figure 13 Eastern Pennsuco Wetlands Map

7.2 Mitigation Plan Development

Concurrent with the preparation of this document, the Corps participated in dialogs with other agencies and the industry to provide an appropriate level of compensatory mitigation. In 1996, representatives from the Corps, Florida Department of Environmental Protection, South Florida Water Management District, and Miami-Dade County Environmental Resource Management Department developed a Lakebelt Mitigation Proposal. That group reviewed the wildlife studies described by Section 3.11, the habitat analysis described in Section 3.12, and the FDEP's, ERP Rule Guidelines. The group proposed to apply a 2.5:1 ratio for mitigation: for every acre of land impacted by mining, 2.5 acres of land within the Pennsuco would be acquired, enhanced, and placed under perpetual maintenance. Separately, the Corps and other Federal agencies have been developing a process to assist the review of compensatory mitigation for applications for permits and mitigation banks. This is described in Chapter 5 of the Joint State and Federal Mitigation Bank Review Team Process for Florida. The process includes: (1) assessment of the loss of wetland functions from mining activities; (2) estimates of wetland functions replaced by creation of the littoral shelves and restoration of lands in the Pennsuco; (3) consideration of the additional temporal loss of function during the time between impact and full growth of the created/restored wetlands; (4) consideration of the additional area of creation/restoration needed due to the risk that 100% of the created/restored area will not reach full growth; and, (5) weighing of the relative public benefits from the wetland functions. Several techniques of assessing the functions are available, including the Hydrogeomorphic Methodology (HGM) developed by an interagency effort led by the Corps Waterways Experiment Station and the Wetland Rapid Assessment Procedure (WRAP) developed by the South Florida Water Management District. The temporal loss and risk are dependent on the nature of the final construction and management plans. The weighing includes an assessment of the role of the wetland in the landscape. For example, two wetland functions (among others) that are present in the study area are wildlife habitat and water quality treatment. For the wildlife habitat function, the wetlands do provide additional spatial area for Everglades wildlife. For water quality, the wetlands do not receive runoff from other non-native landuses therefore there is no treatment being performed. Therefore, the impact to (and restoration of) wildlife habitat function could be weighed higher than the water quality function. While this paragraph is a simplistic presentation, these considerations (function, temporal loss, risk, and weight) are part of the evaluation of compensatory mitigation in applications for permits. The Federal agencies applied various assessment techniques, evaluated risk, assigned temporal loss, and have discussed the relative weight for this project and other permit applications in the region. This list of considerations reflects various requirements of Federal regulations to, find the least damaging practicable alternative, to consider the public interest, and to require appropriate compensatory mitigation. One result of these discussions is a recognition that for some mathematical combinations of functional assessment results, estimates of risk and temporal loss, and the degrees of weighing will result in a suggestion that

replacement of wetland functions lost could require greater than the 2.5 acres proposed in the 1996 document above (and for other combinations, less than 2.5). The current state of these discussions is: (1) an understanding that the numeric calculations are only an aid to the overall evaluation of the mitigation plan and (2) that, based on an evaluation of the all elements of the conceptual plan, restoration of 2.5 acres of Pennsuco wetlands with construction of lake littoral shelves on-site may provide compensation for wetland functions on one acre of mined wetlands. This discussion will be completed during the permit application review process and finalized as part of the permit decision after this EIS document is finalized.

7.3 Proposed Mitigation Plan

The Lakebelt mitigation plan is designed to offset the impacts of mining within the lakebelt area of Miami-Dade County. The mitigation plan was agreed to by the Miami-Dade County Department of Environmental Resource Management, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency. Florida Department of Environmental Protection, South Florida Water Management District, U.S. Fish and Wildlife Service, National Park Service and the mining industry based upon the recommendations from the Lakebelt Implementation Committee. It is based upon an overall mitigation ratio of 2.5 to 1 with an initial cost of $6,142 per acre of mitigation in the Pennsuco wetlands. The key component of the mitigation plan is the establishment by the Florida Legislature of a mitigation fee on all limestone sold from the Lakebelt area. Proceeds from the mitigation fee will be used to perform mitigation activities appropriate for the impacts due to mining such as acquiring environmentally sensitive lands for restoration, their restoration and long term maintenance of their natural functions.

The mitigation fee as approved by the Florida Legislature began October 1, 1999, at an initial rate of $0.05 per ton. The amount of the mitigation fee would be increased annually, beginning January 1, 2001, by 1.9 percent plus a growth cost factor to account for inflation. The growth cost factor is a weighted average of the Employment Cost Index and the Producers Price Index.

An interagency committee that consists of representatives from each of the following: the Miami-Dade County Department of Environmental Resource Management, the Department of Environmental Protection, the South Florida Water Management District, the Game and Fresh Water Fish Commission, and the limerock mining industry shall select a representative to serve as a nonvoting member will authorize expenditures for mitigation and will prepare annual reports. The amount of the mitigation fee per ton will be revisited in the year 2010 and at ten-year intervals to ensure that the revenue is sufficient to perform the required mitigation work.

Other components of the mitigation plan include the following:

1) Protection of Miami-Dade County's Northwest wellfield remains a requirement for the Lakebelt Implementation Committee to address in the Phase II Master Plan which, is

due December 31, 2000. Analysis of wellfield impacts is underway and mitigation measures, if needed, will be recommended in the Phase II Master Plan for inclusion in the Lakebelt Mitigation Plan.

2) Analysis of the hydrologic impacts resulting from future mining. An additional component of mitigation under discussion is the change of groundwater seepage resulting from the excavation. Essentially, the new lakes have a lower resistance to groundwater flow than the rock, and therefore the groundwater flow (from the west to the east) will increase. Modeling described in **Appendix A** of this document indicates that without effective counter-measures, the result could be (1) decreased hydropatterns within the Pennsuco and (2) increased flows of water from the regional Everglades system that would otherwise be available farther south in the natural system. The effect is not immediate: it increases as the mining proceeds. The recommended plan is based on 50 years of mining so the total effect will not be seen until then. **Appendix A** also contains preliminary modeling performed to estimate the effects of adding several water control structures in canals in the Lakebelt area. The modeling shows these structures can reduce the groundwater flow and thereby balance the increase by the lakes. However, this reduction is not evenly distributed across the length of the Lakebelt. There are areas within the Pennsuco that would see some increase in hydropattern and others that would still see a decrease, and the increased amount of water needed from the Everglades regional water buget would vary depending on season and location. The hydrologic model is being refined as part of the Water Preserve Area Feasibility Study and this is also a topic under discussion by the Miami-Dade County Lakebelt Plan Implentation Committee. The final solution must be coordinated with the modifications proposed by the Comprehensive Review of the Central and Southern Florida Project. The current discussions are to determine the appropriate mitigation measures to be incorporated into the master plan to be reported to the State Legislature by December 31, 2000.

3) Mining south of Tamiami Trail would be permitted at present no closer than 2,000 feet east of the L-31N canal. The ultimate extent of mining in this area will be determined in the Phase II Report.

4) Sale "up-front" of miner-owned lands within the Pennsuco wetlands will be negotiated with individual companies who agree in principle to sell at appraised value. The negotiations shall also address royalty mining on government lands in areas appropriate for mining.

5) Mitigation for mining done through permits with "mine now, mitigation later" conditions would be negotiated individually with Miami-Dade County and the U.S. Army Corps of Engineers.

6) Increased mitigation will not be required for areas currently permitted when the permits expire. However, these permitted areas will be subject to the mitigation fees as of October 1, 1999.

7) The U.S. Army Corps of Engineers will accomplish final implementation of the agreed upon mitigation approach through the issuance of permits. Should the U.S. Army Corps of Engineers not issue permits consistent with the Lakebelt provisions in state statute and the Lakebelt Plan accepted by the legislature during the 1997 legislative session, by September 30, 2000, then the mitigation fee will be suspended until re-adopted by the Florida Legislature.

The Lakebelt mitigation plan was contained in the Florida Legislature House Bill 4071. The bill was passed by the Legislature, but vetoed by Governor Chiles. In a letter dated May 28, 1998, to the Secretary of State, Sandra B. Mortham, Governor Chiles said:

"I find especially laudable the Miami-Dade County Lakebelt Mitigation Plan in the bill. Standing alone, the Lakebelt Mitigation Plan would have met with my approval. While I am taking action to veto this bill, I encourage all agencies who would be participating in the Lakebelt Mitigation Plan to carry out its provisions to the degree possible absent the statutory provisions. I strongly encourage the Florida Legislature to take up and pass in 1999 the provisions of the Lakebelt Mitigation Plan, and in the intervening period, I pledge my executive authority to its legal extent to carry out the Lakebelt Mitigation Plan."

Subsequently during the 1999 Florida Legislative session, as hoped by the late Governor Chiles, the Lakebelt Mitigation Plan was approved by the Legislature and signed into law by Governor Jeb Bush.

8.0 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

8.1 National Environmental Policy Act of 1969, as amended

Environmental information on the project has been complied and the Draft Programmatic Environmental Impact Statement, Northwest Miami-Dade County Freshwater Lakebelt Project, dated February 1999. A systematic interdisciplinary approach to planning has been utilized; alternatives have been studied, developed and described; and ecological information has been developed and utilized. A notice of availability for the Draft PEIS was published in the Federal Register, Volume 64, Number 48, on March 12, 1999. The Draft Programmatic Environmental Impact Statement was circulated until May 30, 1999 in accordance with the National Environmental Policy Act for public review and comment. A Final PEIS has been prepared incorporating comments and recommendations provided by state, Federal and local agencies, a native American Tribe, non-governmental organizations, and the public and including a compilation of reviewer comments and agency responses in **Appendix H**. This Final PEIS is being circulated in accordance with the National Environmental Policy Act for a period not less than thirty days.